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ABSTRACT

The Psychometric Needs Assessment (PNA) model was designed to provide a means of describing a target population and various sub-populations contained therein. The specific purpose of such description is to provide a guide to determination of the continuing educational programming needs of professionals. Major attributes of the PNA model are the following: (1) the model emphasizes needs rather than interests in the identification of training programs; (2) PNA is very amenable to rigorous validity testing; (3) the model fits in well with current recruitment practices of middle and senior executives where there is an ever increasing reliance on standardized psychometric evaluation; (4) data collection instruments are standardized, resulting in a greater knowledge of the inherent error factor; and (5) while most characteristics are tested by non-behavioral means (attitudes, etc.), this disadvantage is also a characteristic of more traditional needs assessment strategies. The model was tested in the early 1970s with 677 male junior and senior-level personnel from four occupational categories: sales, engineering, administration and finance. Discriminant analysis was used in analyzing data from a four-test psychological screening battery to provide differentiation between typical characteristics between professional groups and differentiation within groups as a function of seniority or experience. It was concluded that the model offers promise as a reasoned, though complex, approach to the needs assessment process for business professionals. (Statistical data from the test of the model is included.) (DTT)

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Psychometric Needs Assessment Theory and Practice

Presentation to Adult Education Research Conference, San Antonio, Texas April, 1978

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Practice notwithstanding, all adult educational programming is (or ought to be) concerned with individual educational needs. Hopefully, it is the needs of the individual that manifest a significant thrust in the determination of adult educational programming, but it would be naive to think that the needs of the educational agency and the foibles of the programmer do not manifest significant interaction effects on the direction of every educational agency's programming.

Any survey of the adult educational literature indicates that although most writers would agree <u>that</u> needs are important, there is little tacit agreement as to <u>what</u> needs are or <u>how</u> they should be used in educational programming. Thus we have basic needs, felt needs, expressed needs, real needs, normative needs, comparative needs, criterion needs, prescriptive needs, motivational needs, etc. (Atwood & Ellis, 1971; Monette, 1977). The similarities and differences between the different concepts of needs have to do with <u>who</u> defines the needs and <u>how</u> the needs are defined.

Insert Figure 1 Here

In terms of who defines the needs, we have self-defined and other-defined models; in terms of the process of needs definition we have self-diagnosed and other-diagnosed assessment methodologies. The four combinative categories of needs assessment typologies presented in Figure 1, although simplistic, offer an efficient way to integrate much of what is currently available in state-of-the-art needs assessment. Many of the currently used needs assessment terms fit into several of my four categories. Each of these four categories could be broken down still further into a number of discrete

although related sub-categories. For purposes of this paper however, I will not belabour the point by further expansion. The choice of which needs assessment categories will be utilized by any given programmer in any given educational program depends on a number of factors such as the value orientation of the programmer and agency, nature of the educational program, importance of the program, program replicability, sophistication of the programmer, accessibility of the clientele, and budget. What is a useful needs assessment strategy in one situation may not be appropriate in another.

Quite obviously, the easiest type of needs assessment is that "seat of the pants" method used by most programmers;other-defined and appraised (quadrant 3 of Figure 1) with the programmer being the "other" in this case. More sophisticated needs assessment strategies might involve all four quadrants in developing a total integrative approach. (Programmers who worry about convergence of needs assessment strategies may lose sleep over the possible sources of interaction error at this point).

In an earlier paper (Scissons, 1977a) I concurred with Witkin (1976) who adopted an operational definition of needs in terms of a "measurable discrepancy between current outcomes and desired or required outcomes". This definition subsumes all categories from Figure 1 since needs collection strategies are left undeterminate. It is this definition that I will cling to in this paper since it forms a pillar of the Psychometric Needs Assessment (PNA) model which I now wish to address myself.

Use of psychological tests is as old as psychology itself. Psychological tests are best thought of as a highly structured and standardized interview and

are used to appraise a wide variety of personological characteristics. Psychological test results are normally used in one of two fashions; clinically or actuarily. Clinical use of psychological tests involves the use of "clinical wisdom" or expertise to integrate information and formulate hypotheses. Actuarial use of psychological test information involves the use of statistical analyses and decision theory to formulate individualistic or group hypotheses. There has been a great deal of controversy in the psychological literature over these two different methods of psychological test use (Gough, 1962; Scissons, 1977b); evidence has been mounting in both camps as to the most efficacious method of test utilization. The primary use of tests is in diagnosis, what Monette (1977) would call appraisal. This diagnosis is typically done for one of two reasons; assessment or remediation. Remediation is most typically undertaken in clinical psychology or psychotherapy, assessment in industrial psychology. In short then, tests are utilized for diagnosis in order to map client change strategies or for individual/group vocational placement.

The generalized use of psychological tests has come under scrutiny on the grounds of their questionable validity; tests and test users have been accused of nearly every sort of justified and unjustified shortcoming. The advantages of using psychological tests in people appraisal is their standardized approach to measurement and the fact that, although of imperfect validity, the degree of invalidity is more readily recognized. As well, and this is important for the handling of group data, psychological test scores are readily amenable to statistical analyses.

Psychometric Needs Assessment (PNA), a term I have coined (Scissons,

1977a) which refers to the use of psychological tests in needs assessment, utilizes standard psychometric evaluators to form the data base on which these needs are inferred. In terms of our earlier model, this inference takes place in quadrants 1 and 2 of Figure 1, i.e., the needs are inferred by self or others. Two patterns of analyses of PNA information are typically undertaken. In the first pattern an individual's profile is compared with that of a typical profile of the desired subgroup (clinical integration of information). In the second pattern, particular subgroups of profiles are compared to other subgroup profiles as an aid to macro decision making (actuarial integration of information). For example, we may compare the profile of a prospective university student with that of a junior engineer as an aid to vocational counselling or, at a more general level, we may compare the profiles of junior and senior engineers as an aid to the design of a supervisory program for junior engineers. In point of fact, these are the methods by which all needs assessment information is utilized - where this approach differs is in the nature of the information and the ease of which the acturial comparisons can be undertaken.

Insert Figure 2 Here

Figure 2 diagrams this process of utilization of needs assessment information.

A traditional argument against the use of standardized psychometric measures in people appraisal has rested on the heterogenous norm base of most psychometric instruments. In order to be widely accepted, norms from most

psychometric instruments are reported in terms of ratings for a fictitious "average" person. This average person is arrived at by the pooling of results of a widely heterogenous group. The problem with such norms is that they hide as much as they reveal. Important differences within groups are masked by possibly larger between group differences leaving a bland "typical" profile. For both clinical and actuarial use of psychometric test information, subgroup norming is a necessity. As we shall see later, intra-subgroup norming is also necessary for many types of analyses.

In an earlier paper (Scissons, 1977a) I pointed out the fallacy of using heterogenous norms in the assessment of middle and senior executive abilities. Subjects in that study differed markedly from the general population in virtually all appraised categories; in most categories their scores were elevated as compared to the normal population. However, executives as a subgroup are still too large and heterogenous to provide useful data for either individual comparisons or intra-subgroup analyses. Those data were interesting to demonstrate a principle but too crude to be useful at a practical level.

Method

In this present study I have expanded my earlier work to include four general professional occupational categories; sales, engineering, administrative and financial executives. To illustrate the use of PNA as a guide to determination of the continuing educational programming needs of professionals, I will describe its use in (a) a differentiation between the typical characteristics between professional groups and (b) differentiation within groups as a function of seniority or experience. As in my earlier work with the general executive

subgroup, all subjects in the four professional categories were administered a psychological screening battery consisting of the California Psychological Inventory, Management Aptitude Inventory, Edwards Personal Preference Schedule, and Vocational Preference Inventory. I will not describe these tests in detail in this report. Complete descriptions are available in the relevant test manual or through the Mental Measurement Yearbooks. As well, specific subgroups were administered a number of other psychological instruments but these are irrelevant to this study.

All subjects (N=677) were administered these tests in the early 1970's as part of their industrial appraisal preliminary to their selection as employees or as part of an intra-organizational analysis. All work was performed by psychometricians employed by A.W. Fraser and Associates, an Edmonton, Alberta, Canada based firm of Industrial Psychologists and Management Consultants. All subjects are male; the small number of females in the original sample were excluded in the interests in data homogeneity. With few exceptions all subjects were employed by private industry rather than government. Table 1 below provides additional demographic information on subjects which may be of interest to researchers concerned with generalizability.

Insert Table 1 Here

Data Analysis Techniques

Rather than make the two analyses referred to earlier on a simple profile basis, I have used Discriminant Analysis to identify those of the

appraised personological characteristics which best differentiate between subgroups. The use of this technique is necessary because of the inter-correlation of human attributes, i.e. even though the differences between groups on one variable may seem to be quite large, this difference may be explainable by inter-relationships to other variables. Discriminant Analysis controls for this effect and attempts to isolate "pure" variance (the amount of variability not accounted for by inter-correlation to other variables). i.e. subtest scores which best distinguish between subgroups regardless of the actual magnitudes of the apparent differences. The profiled results for each of the four tests administered for each of the four professional groups are appended to this report.

Between-Group Analysis

Each of these 677 subjects obtained scores on 48 different variables which represent the sub-scale scores for the Management Aptitude Inventory, California Psychological Inventory, Edwards Personal Preference Schedule and Vocational Preference Inventory. Two discriminant analyses were undertaken; the first using the 225 junior professionals in the four professional categories, the second using the 452 senior professionals.

Junior Level Analysis

Table 2 presents data pertinent to the discriminant analysis undertaken with the psychometric data from the junior level professionals (N=225).

Insert Table 2 Here

As is evidenced by Table 2, three useful discriminant functions were generated, each with a significant Eigenvalue, Canonical Correlation and Wilks' Lambda. Further analysis reveals that using the standardized functions in a predictive equation applied to the original data results in a correct classification in 66% of the cases (purely chance classification would have a 25% mean accuracy rate).

Further to the data presented in Table 2, Table 3 presents mean score information for the five most significantly discriminating variables for each of the four professional groups.

Insert Table 3 Here

As evidenced byTable 3, the five personological variables which best differentiate between the four junior level professional groups are associated with personological traits such as interpersonal dominance, preference for ambiguous verbal tasks, power and status orientation, conventionality, analytical problem solving, self-control, drive, ambition and self-determination.

Looking at the scores between professional categories, one is able to get a more complete picture of each of the professional groupings i.e., the junior engineers as low in sociability and status drive and high analytical problem solving, hard procedures oriented workers; the junior sales person as impulsive, dominant, ambitious and determined. In short, a confirmation of many popular sterotypes.

Senior Level Analysis

Table 4 presents data pertinent to the discriminant analysis undertaken

with the psychometric data from the senior level professionals (N=452).

Insert Table 4 Here

Once again, as was the case with junior level professionals, three useful discriminant functions were generated, each with a significant Eigenvalue, Canonical Correlation and Wilks' Lambda. Using these standardized discriminant functions coefficients in the predictive equations for group membership yields a correct classification in 64% of the cases.

Associated with the data presented in Table 4, Table 5 presents mean scores for the five most significantly discriminating variables for each of the four professional groups.

Insert Table 5 Here

Three of the variables (VPI-Ent; VPI-Conv.; VPI-Int) which provide maximal discrimination for the senior groups are identical to those which were maximally discriminating for the junior groups. Variables which provide maximal discrimination are concerned with personological traits such as dominance, preference for unstructured verbal tasks, status-drive, practical mindedness, social interests, self-analysis, conventional orientation, autonomy and analytical problem solving orientation. As with the junior grouping, a profile develops within and between each occupational grouping i.e., the senior financial professional as low status oriented and conventional; the senior administrator as controlled, defensive, disliking of ambiguity and independent.

Clearly, the use of discriminant analysis with personological psychometric data is a useful method to distinguish professional groups on the basis of appraised characteristics. Before looking at the relationship of this information to the needs identification process, let us look at differences within occupational groups as a function of experience and responsibility.

Within-Groups Analyses

Tables six through nine present data pertinent to the discriminant analyses undertaken between levels within each of the four professional groups. Junior level professionals possessed approximately one to three years of experience in their profession and/or were employed at junior levels. Senior level subjects had more than three years of experience and/or were employed at more senior supervisory positions.

Insert Tables 6-9 Here

Tables ten through thirteen present the five most significantly discriminating variables for each of the four professional groups. In each case, the discriminant functions, when used in the appropriate predictive equations, yielded a discriminant accuracy of Sales=83%, Engineers=80%, Financial=80%, Administrators=80%.

Insert Tables 10-13 Here

Sales. For the Sales group, the five most discriminating variables deal with personological traits such as concern with others reactions, autonomy, hard-headed business orientation, self-control or freedom from impulsiveness,

and a sense of personal worth. The senior sales professional presents himself as more poised, more procedures oriented, more business like and less implusive than his junior counterpart. In short, a more mature business attitude is displayed.

Engineers. For Engineers, the five variables which best discriminate between junior and senior levels of experience deal with traits such as work drive, tolerance, willingness to accept another's opinion, persistence and flexability in approach. Unlike other professional groups, it is the junior group which displays the more superior leadership charactertistics. Engineers seem to be promoted to supervisory positions on the basis of being a "good" engineer even though many of the personological characteristics which contribute to being a "good" engineer are antithetical to being a good supervisor or manager.

Financial. Accountants and Financial Managers are best differentiated within groups on the basis of traits such as autonomy, overly critical, interpersonal attitude, dependability, commonsense, and adherence to accepted modal patterns of behavior. The senior financial manager could be described as more independent acting and mellow in his dealings with subordinates than his junior counterpart, who may be viewed as brash.

Administrators. General business administrators (includes personnel administrators) are most clearly discriminated on personological characteristics such as high status orientation, personal assertiveness and confidence, desire to accomplish, ability to follow instructions and take suggestions from others, and a flexable and adaptable work style. The senior administrator is more

status seeking, confident, hardworking and flexable than his junior counterpart.

Psychometric Data and the Needs Assessment Process

It is evident that the primary use of my PNA model is to describe the target population and various sub-populations contained therein. As noted earlier in this paper, psychometrics are used to provide the data base on which needs are inferred. I have come down squarely on the side of needs assessment as a diagnostic process with the client (subject) participating in the process at the decision procedure level (quadrants 1 and 2 of Figure 1).

The process of inferring educational needs from the PNA data depends on which type of need is being inferred. Referring again to Figure 2, we see that needs are inferred at an individual or group level. At an individual level one is concerned with selection of appropriate learning programs. At a group level, emphasis is on both selection and design of programs. Let me illustrate how PNA data may be used with the inferring of individual needs in the case of the developmental counselling of a junior accountant and the training needs of senior engineers.

In the case of our junior accountant we see that criterion differentiating attributes between junior and senior financial managers are concerned with interpersonal skills, dependability, short-term business planning and indpendent work style. This information is compared to the psychometric information obtained from our junior accountant. This comparison forms the basis of a developmental vocational counselling session(s) in which future training programs are mapped out. Of necessity, this process is highly individualistic

and requires a good deal of clinical expertise.

In the case of our senior engineering group, their profiles are compared with senior managers in other professional areas, particularly business managers (since their job involves a disproportionate amount of people supervision) in order to map out the design of a generalized training program for senior engineers. In this case, attention would focus on designing a training program(s) which focused on giving supervisory directions, monitoring work performance, allowing for individual initiative, motivation etc., i.e., skill development in non-engineering areas. An alternate method in using PNA data would be to compare subgroups results (senior engineers) with "expert" derived criterion levels and design training program based on any perceived discrepancy.

The major use PNA information is in designing the content of professional training programs, particularly for junior professionals. My own experience has been most directly with engineers, where considerable effort is spent in analyzing the junior-senior differences evident in the PNA data as a guide to "tailor made" training programs. Not that we would ever want our junior professionals to undertake training programs which would cause them to mirror the senior group (particularly with the engineering group), but the use of PNA data does provide a basis for where and why we want to go. I have been particularly active in using PNA data for the design of interpersonal effectiveness and supervisory skill training programs for junior engineers.

Another major use of PNA data is in the individual developmental counselling of university students and/or executives considering career development, change or reorientation. Using individual appraisal results in conjunction with

subgroup results from various professions aids in the vocational decision making process. Not that such information is infallible or should be used exclusively, but PNA data is highly contributory to the total developmental vocational counselling process.

Let me reiterate some of the other attributes of my PNA model outlined in an earlier paper (Scissons, 1977a).

1. The PNA model emphasizes needs rather than interests in the identification of training programs.
2. PNA is very amenable to rigorous validity testing.
3. The model fits in well with current recruitment practices of middle and senior executives where there is an ever increasing reliance on standardized psychometric evaluation.
4. Data collection instruments are standardized resulting in a greater knowledge of the inherent error factor.
5. One disadvantage is that most characteristics tested are done so by non-behavioral means (attitudes etc.) but this disadvantage is also a characteristic of more traditional needs assessment strategies.

It is still somewhat premature to argue for the efficacy of the PNA procedure in the design of training programs for professionals. My own feeling is that it is unlikely that such procedures will become widespread because of their relative complexity and slow on-stream time, as well as the unavailability of subjects in order to obtain relevant subgroup information. As noted earlier (Scissons, 1977a), PNA data is most useful in conjunction with other data which may be gathered as part of the needs assessment process. Until detailed inter-

method reliability studies are conducted with the myriad of needs assessment strategies currently in use, it is a moot point to argue for or against the use of any single needs assessment strategy. In conclusion, let me say that the PNA method is relatively complex and, as yet, not subjected to rigorous validity testing. However, it does offer a good deal of promise as a reasoned, albeit complex, approach to the needs assessment process for business professionals.

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Table 1

Subject Description

	N	Age	Dependent Children	Educ. Level (in years)	Life Insurance Carried (Thousands)	Present Salary (Thousands)	Next Year Income Goal (Thousands)
Sales							
Junior	59	34.49	2.21	12.91	31.72	12.17	14.05
Senior	63	39.70	2.23	13.41	30.33	9.75	16.49
Combined	122	37.16	2.22	13.16	33.13	14.05	15.32
Engineering							
Junior	57	28.47	2.29	16.83	24.57	12.38	14.74
Senior	139	37.50	2.37	16.98	47.97	20.82	23.26
Combined	196	35.08	2.36	16.94	42.07	18.48	20.42
Financial							
Junior	44	31.12	1.94	15.47	36.65	13.11	15.19
Senior	81	35.03	2.21	15.61	41.03	18.33	21.07
Combined	125	35.03	2.13	15.56	39.48	16.73	18.95
Administrative							
Junior	65	32.07	1.86	14.69	44.15	13.48	17.10
Senior	169	39.48	2.38	15.25	38.71	19.23	22.55
Combined	234	37.45	2.28	15.09	46.46	17.55	20.89

Table 2

Discriminant Analysis Between Engineers vs. Sales vs. Finance vs. Administrators

Junior Level (N=225)

Variable Name	Standardized Discriminant Function Coefficients		
	FUNC 1	FUNC 2	FUNC 3
MAI-I	.18729	.29908	.06425
MAI-A	-.01081	-.35206	.20452
CPI-Cs	-.21184	.00802	.34666
CPI-Sy	.15213	-.48505	.23507
CPI-Sp	.00179	-.55621	-.16436
CPI-Sa	.07462	.34851	-.37505
CPI-Sc	.27028	-.62964	.21588
CPI-To	-.24335	.51647	-.33295
CPI-Ac	.10233	.30627	.21055
CPI-Py	.21472	.26245	-.37522
CPI-Fx	.38458	-.40882	.22039
CPI-Fe	-.00481	.21830	-.21003
VPI-Real	.17181	-.29097	-.51720
VPI-Int	.05491	-.34237	-.30103
VPI-Soc	-.09287	.49616	.03835
VPI-Conv	.21632	.25554	.66382
VPI-Ent	-.52710	.04071	-.19570
VPI-Art	.24778	-.01681	-.03360
VPI-St	-.09555	-.49860	-.04380
EPPS-Ord	.25521	-.19630	-.04037
EPPS-Exh	-.18917	.12505	.21334
EPPS-Suc	-.13420	.18748	-.16900
EPPS-End	-.17757	-.10934	.17431
Eigenvalue	.73628	.37182	.22033
Cononical Correlation	.651	.521	.425
Wilks' Lambda	.34440	.5973	.8195

Table 3

Mean Scores of Important Variables Identified Through Stepwise Discriminant Analysis

Junior Level

Variable Name	Engineer	Sales	Financial	Administrative
VPI-Ent	6.65	10.09	7.17	7.94
VPI-Conv.	5.24	4.18	7.10	5.34
VPI-Int	8.82	5.21	6.12	6.25
CPI-Sc	32.51	27.34	34.10	30.72
MAI-A	11.81	12.35	11.96	10.51

Table 4

Discriminant Analysis Between Engineers vs. Sales vs. Finance vs. Administrators

Senior Level (N=452)

Variable Name	Standardized Discriminant Function Coefficients		
	FUNC 1	FUNC 2	FUNC 3
MAI-I	-.05219	.18446	.01931
MAI-L	.12060	-.11206	.10294
MAI-A	.17284	-.14669	.13940
MAI-R	.03514	-.02418	.28082
CPI-Do	-.13843	-.05087	.33361
CPI-Cs	.16102	-.13751	-.04375
CPI-Sp	-.00511	.15195	-.40541
CPI-So	-.16221	-.10453	-.22275
CPI-Sc	.30689	-.20215	-.34902
CPI-Cm	.22334	.08218	-.10020
CPI-Ac	.08098	.20124	.46696
CPI-Ai	-.22376	.32785	-.06983
CPI-Py	-.23305	.04762	-.04430
CPI-Fx	.00707	.13548	.39065
VPI-Real	-.68003	-.44569	.16568
VPI-Int	-.22955	-.06368	.11193
VPI-Soc	.34213	.03619	.28239
VPI-Conv	.12069	.72522	-.46043
VPI-Ent	.48620	-.34189	-.29398
VPI-Mf	.16049	-.13266	.16553
VPI-St	-.23525	.15698	.19615
EPPS-Eth	.17595	-.00897	-.08775
EPPS-Aff	-.01678	-.07554	-.36137
EPPS-Int	.08243	.11213	.20919
Eigenvalue	.52312	.25513	.14100
Canonical Correlation	.586	.451	.352
Wilk's Lambda	.4584	.6983	.8764

Table 5

Mean Scores of Important Variables Identified Through Stepwise Discriminant Analysis

Senior Level

Variable Name	Engineer	Sales	Financial	Administrative
VPI-Ent	6.36	10.06	7.74	7.73
VPI-Real	6.72	5.13	4.52	4.31
VPI-Conv.	4.61	4.95	6.67	5.09
CPI-Ai	21.55	18.29	21.74	21.65
VPI-Int	8.76	5.73	6.42	6.83

Table 6

Discriminant Analysis Between Junior and Senior Sales

N=122

Variable Name	Standardized Discriminant Function Coefficient
MAI-L	.13020
CPI-Do	.32945
CPI-Sp	-.24668
CPI-Sa	.36633
CPI-Wb	-.23982
CPI-Re	-.59496
CPI-Sc	.87173
CPI-Ac	.33588
CPI-Ai	-.35042
CPI-Py	-.17447
VPI-Real	.21069
VPI-Soc	.24257
VPI-Ent	-.14729
VPI-Art	.23073
VPI-Mf	.31353
EPPS-Ord	.18167
EPPS-Exh	-.30341
EPPS-Aff	-.33271
EPPS-Int	-.29145
EPPS-Suc	.15575
EPPS-Aba	-.21554
EPPS-Chg	.32808
EPPS-End	-.25490
EPPS-Agg	-.21479
Eigenvalue	.82369
Canonical Correlation	.672
Wilks' Lambda	.5483

Table 7

Discriminant Analysis Between Junior and Senior Engineers

N=196

Variable Name	Standardized Discriminant Function Coefficient
MAI-A	.39057
MAI-R	.35358
CPI-Cs	-.59462
CPI-Sy	.56110
CPI-Gi	.33736
CPI-Cm	.19984
CPI-Fx	.44384
CPI-Fe	.31557
VPI-Real	-.20550
VPI-Conv	.21608
VPI-Mf	.23257
EPPS-Def	-.49454
EPPS-Suc	-.30200
EPPS-Dom	-.41384
EPPS-Nur	-.29363
EPPS-Chg	-.20614
Eigenvalue	.32824
Cononical Correlation	.497
Wilks' Lambda	.7529

Table 8

Discriminant Analysis Between Junior and Senior Financial

N=125

Variable Name	Standardized Discriminant Function Coefficient
MAI-A	-.40290
CPI-Sy	-.32134
CPI-Sp	.42434
CPI-Wb	.24344
CPI-Cm	.22704
CPI-Ac	-.66886
CPI-Ai	.61192
CPI-Py	.22538
CPI-Fx	-.50205
VPI-Ent	.35060
EPPS-Def	.26671
EPPS-Exh	-.21848
EPPS-Aff	.20800
EPPS-Suc	.33179
EPPS-End	-.27275
EPPS-Con	.41200
Eigenvalue	.50935
Canonical Correlation	.581
Wilks' Lambda	.6625

Table 9

Discriminant Analysis Between Junior and Senior Administrators

N=234

Variable Name	Standardized Discriminant Function Coefficient
MAI-A	-.19547
CPI-Do	-.23740
CPI-Cs	-.37688
CPI-Sc	-.83137
CPI-Gi	.65042
CPI-Ie	.28360
CPI-Py	.33255
CPI-Fx	-.48922
CPI-Fe	.16645
VPI-Int	-.25922
VPI-St	-.43161
VPI-Inf	.30530
VPI-Ac	.44612
EPPS-Ach	-.32445
EPPS-Def	-.21481
EPPS-Ord	-.23576
EPPS-Dom	-.27113
EPPS-Nur	-.21184
EPPS-Chg	-.17444
Eigenvalue	.33400
Canonical Correlation	.500
Wilks' Lambda	.7496

Table 10

Mean Scores of Important Variables Identified Through Stepwise Discriminant Analysis

Sales (N=122)

Variable Name	Junior	Senior
CPI-Gi	18.96	22.60
CPI-Ai	19.77	18.29
VPI-Real	4.02	5.13
CPI-Sc	27.34	31.67
CPI-Sa	23.91	23.83

Table 11

Mean Scores of Important Variables Identified Through Stepwise Discriminant Analysis

Engineers (N=196)

Variable Name	Junior	Senior
MAI-A	11.81	10.66
MAI-R	11.52	11.01
EPPS-Def	12.04	13.03
EPPS-End	18.18	17.16
CPI-Fx	10.35	9.63

Table 12

Mean Scores of Important Variables Identified Through Stepwise Discriminant Analysis

Financial (N=125)

Variable Name	Junior	Senior
CPI-Ai	20.13	21.94
EPPS-Agg	19.20	17.22
CPI-Cm	25.90	26.46
CPI-Ac	31.48	30.65
EPPS-Con	11.83	12.16

Table 13

Mean Scores of Important Variables Identified Through Stepwise Discriminant Analysis

Administration (N=234)

Variable Name	Junior	Senior
VPI-St	8.63	10.03
CPI-Cs	20.80	22.27
EPPS-Ach	17.86	19.52
EPPS-Def	12.09	13.22
CPI-Fx	8.78	9.95

THE PROCESS OF NEEDS IDENTIFICATION

DECISION PROCEDURE

ASSESSMENT PROCEDURE	SELF-MADE	OTHER-MADE
OTHER-APPRAISAL	- discrepancy - normative - psychometric I	- system discrepancy - discrepancy - normative - psychometric - real - clinical II
SELF-APPRAISAL	IV - basic - felt - wants - interests	III - clinical

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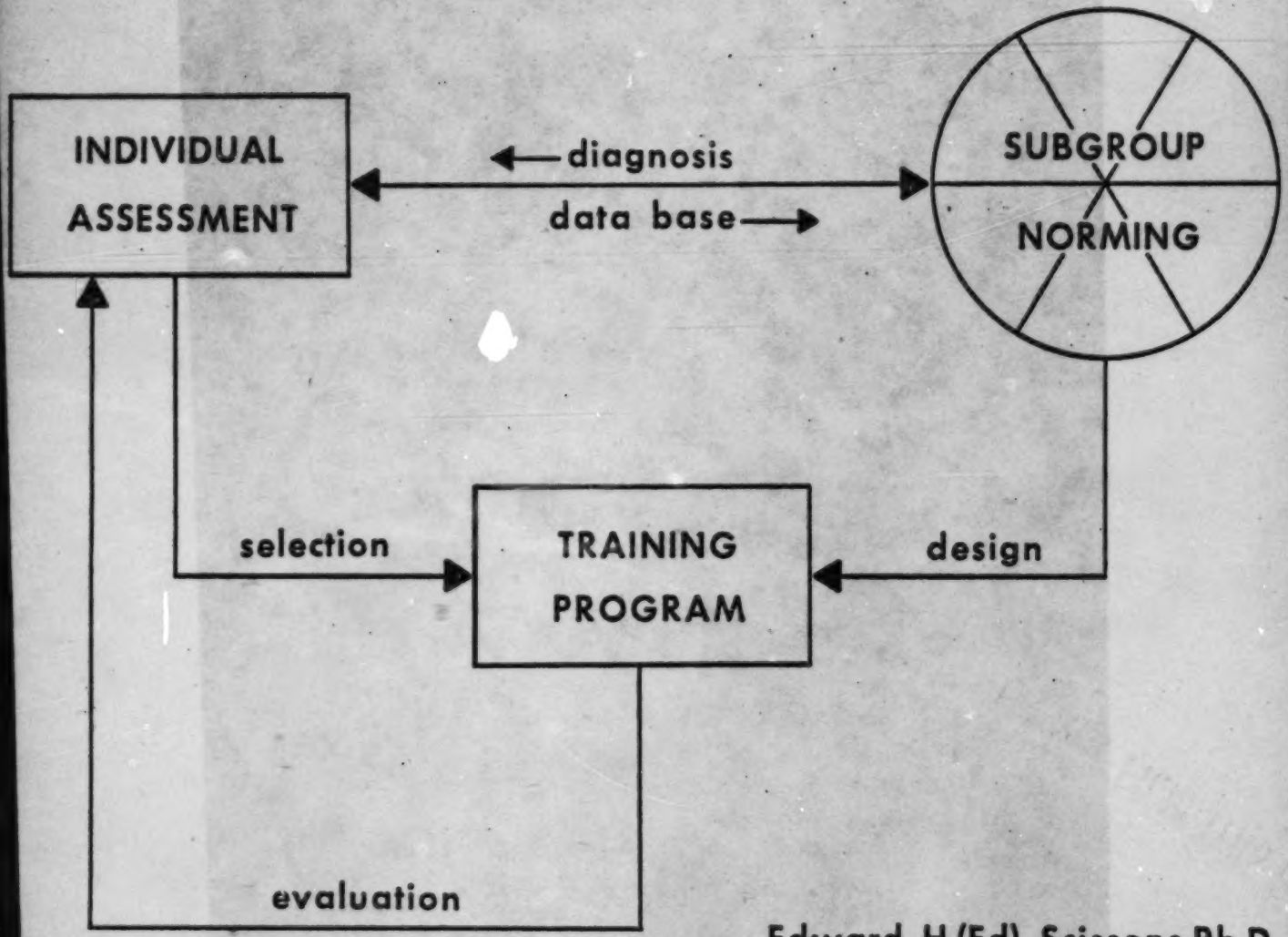
PSYCHOMETRIC NEEDS ASSESSMENT



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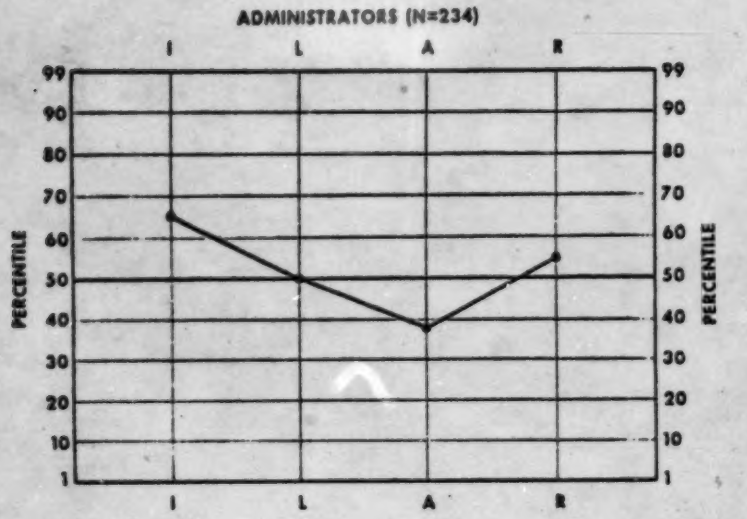
Management Aptitude Inventory



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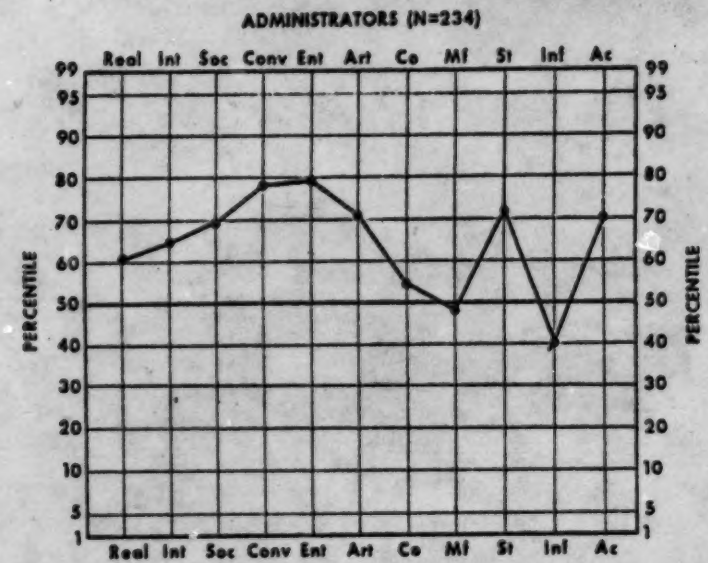
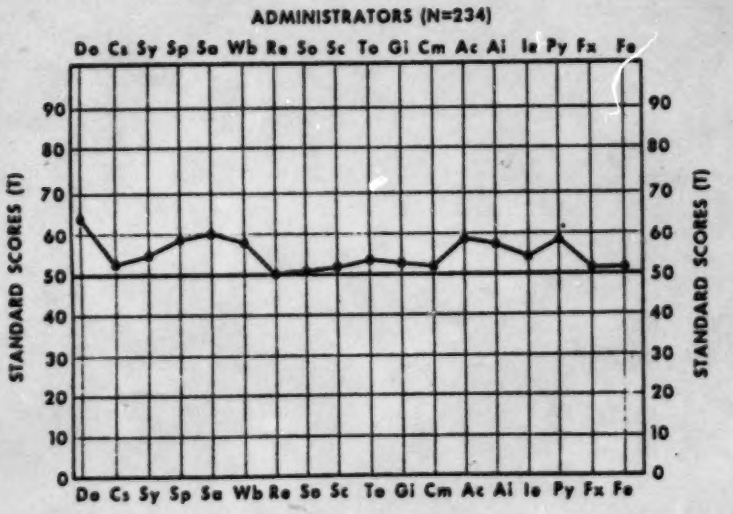
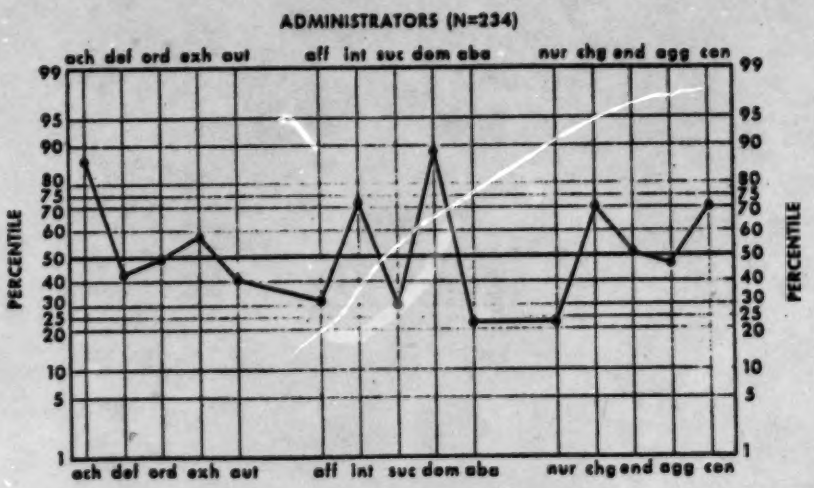


California Psychological Inventory



Edwards Personal Preference Schedule


ADMINISTRATORS (N=234)
ach def ord exh aut aff int suc dom aba nur chg end agg con
PERCENTILE
99 95 90 80 75 70 60 50 40 30 25 20 10 5 1

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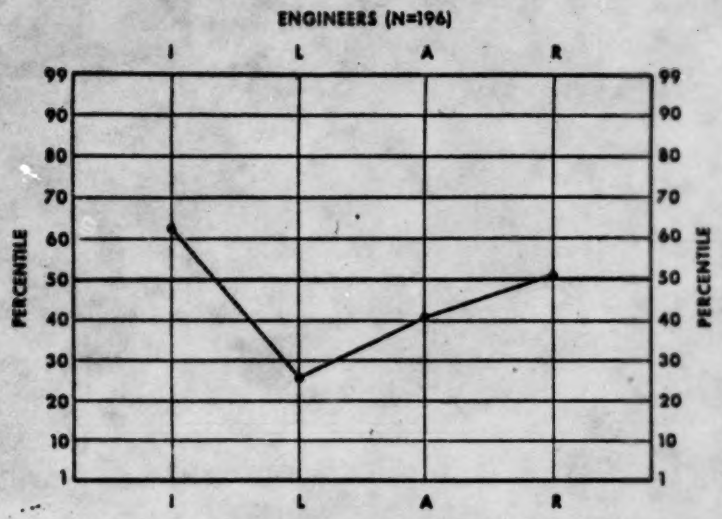
Management Aptitude Inventory



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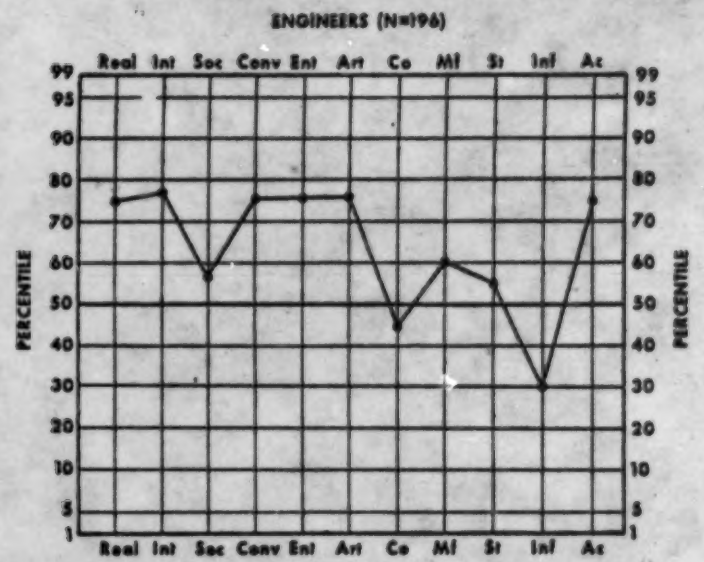
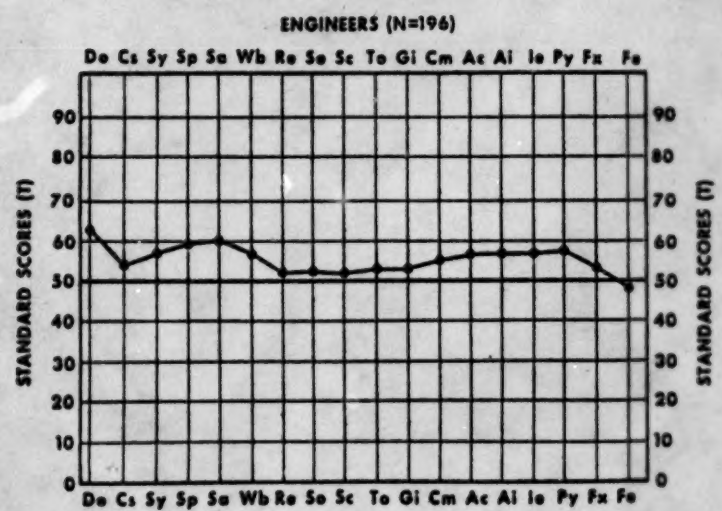


California Psychological Inventory



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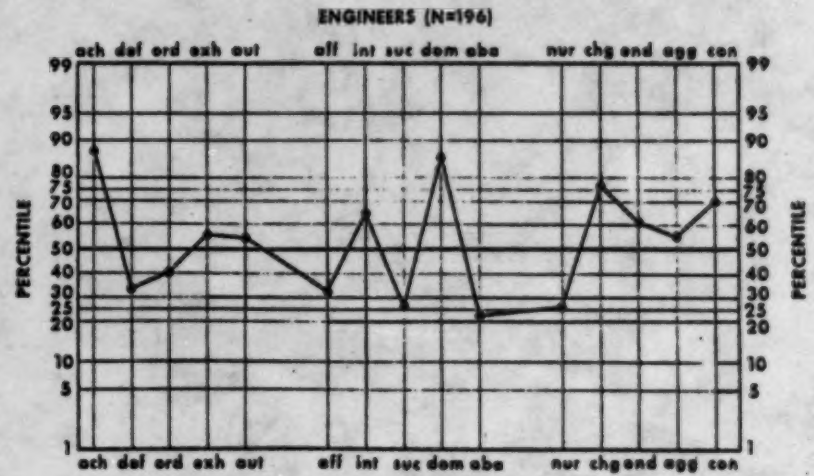

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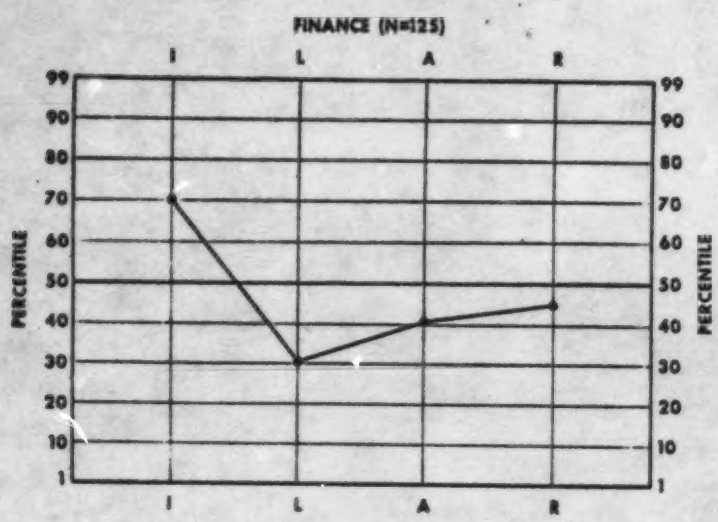

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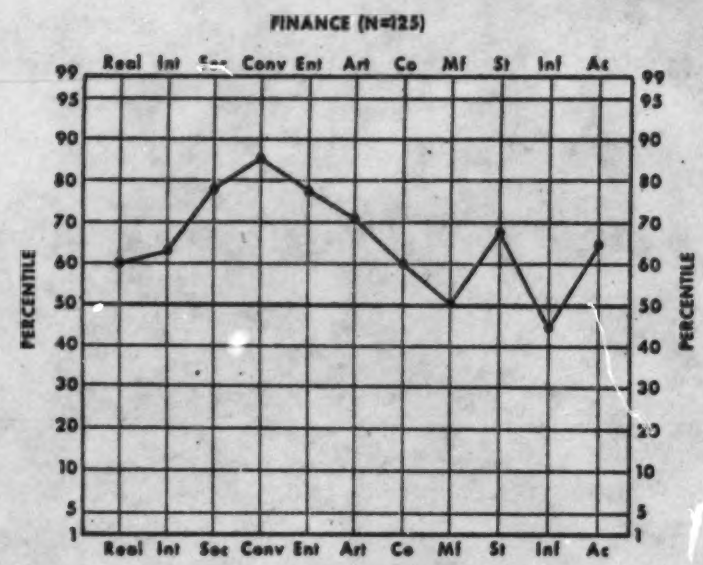
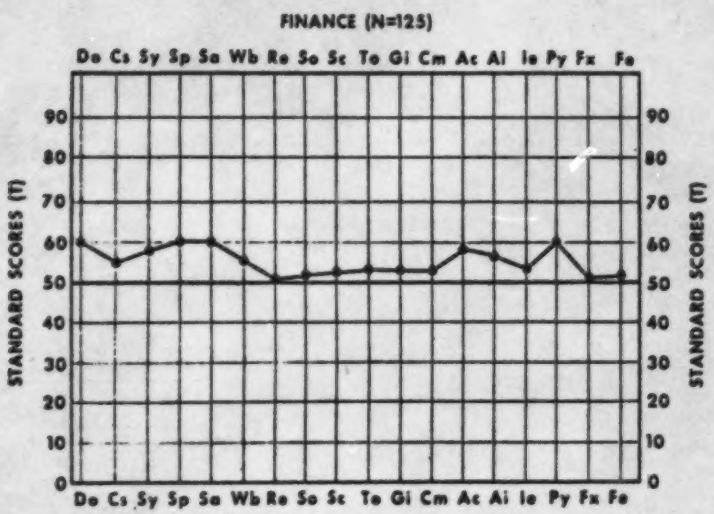


California Psychological Inventory



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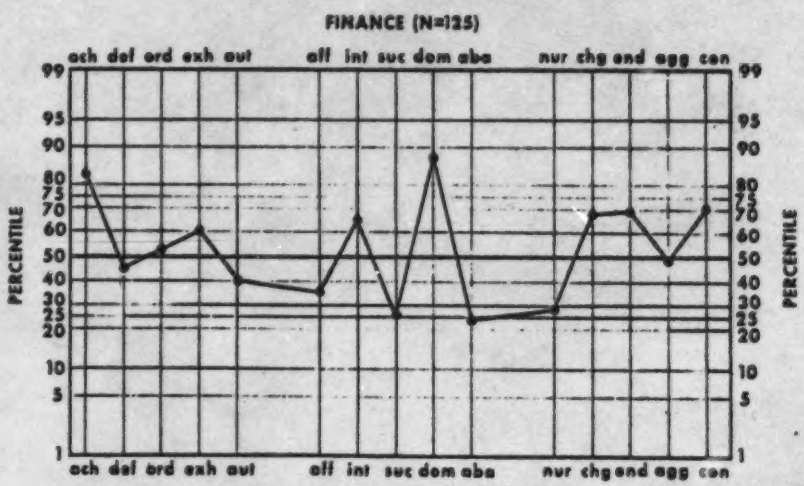
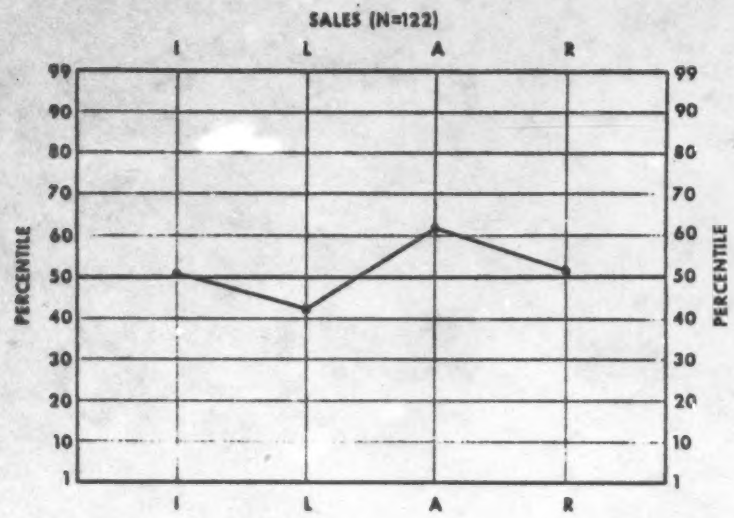


Management Aptitude Inventory



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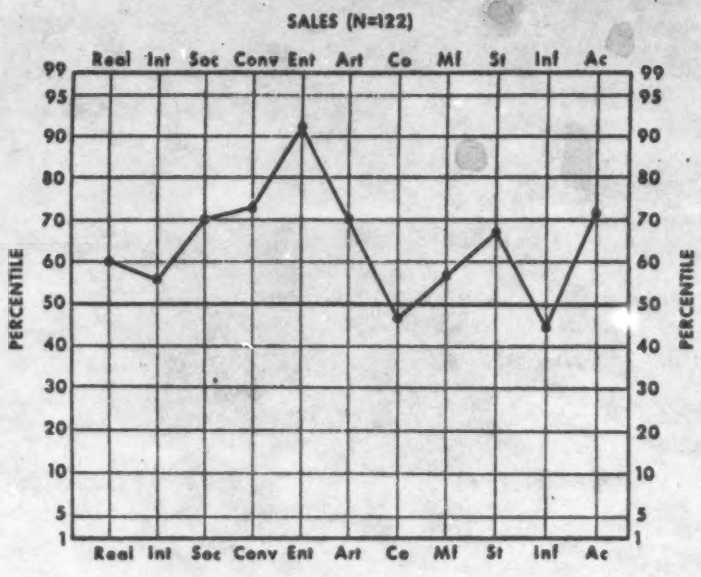
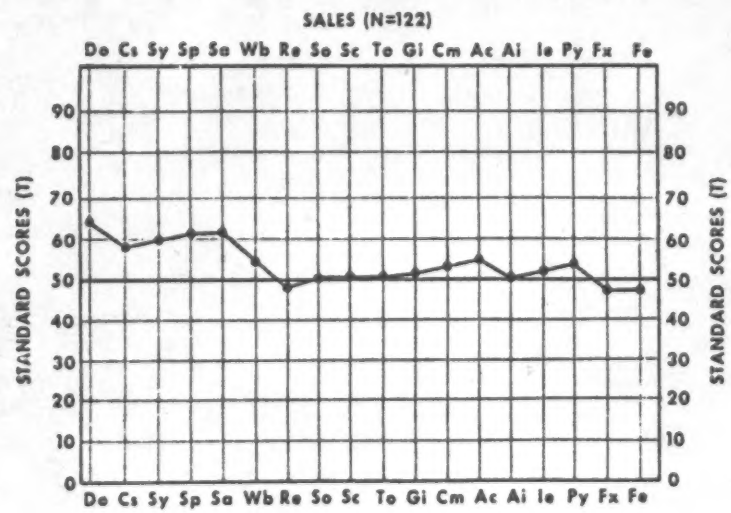
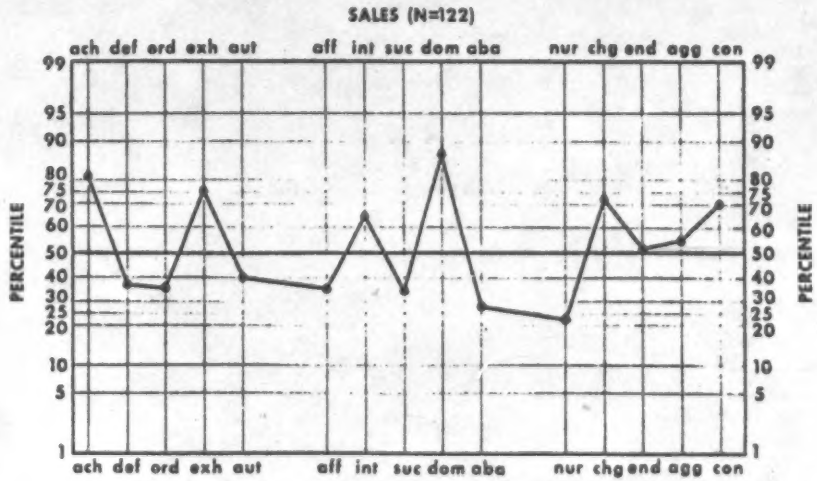


California Psychological Inventory



Edwards Personal Preference Schedule



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